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ABSTRACT

This student module on Coast Guard regulations applied to offshore drilling is one of 50 modules concerned with job safety and health. This module presents requirements that apply to the design, construction, equipment, inspection, and operation of offshore drilling units. Following the introduction, 10 objectives (each keyed to a page in the text) the student is expected to accomplish are listed (e.g., Characterize the ventilation requirements for mobile offshore drilling units). Then each objective is taught in detail, sometimes accompanied by illustrations. Learning activities are included. A list of references and answers to learning activities complete the module. (CT)

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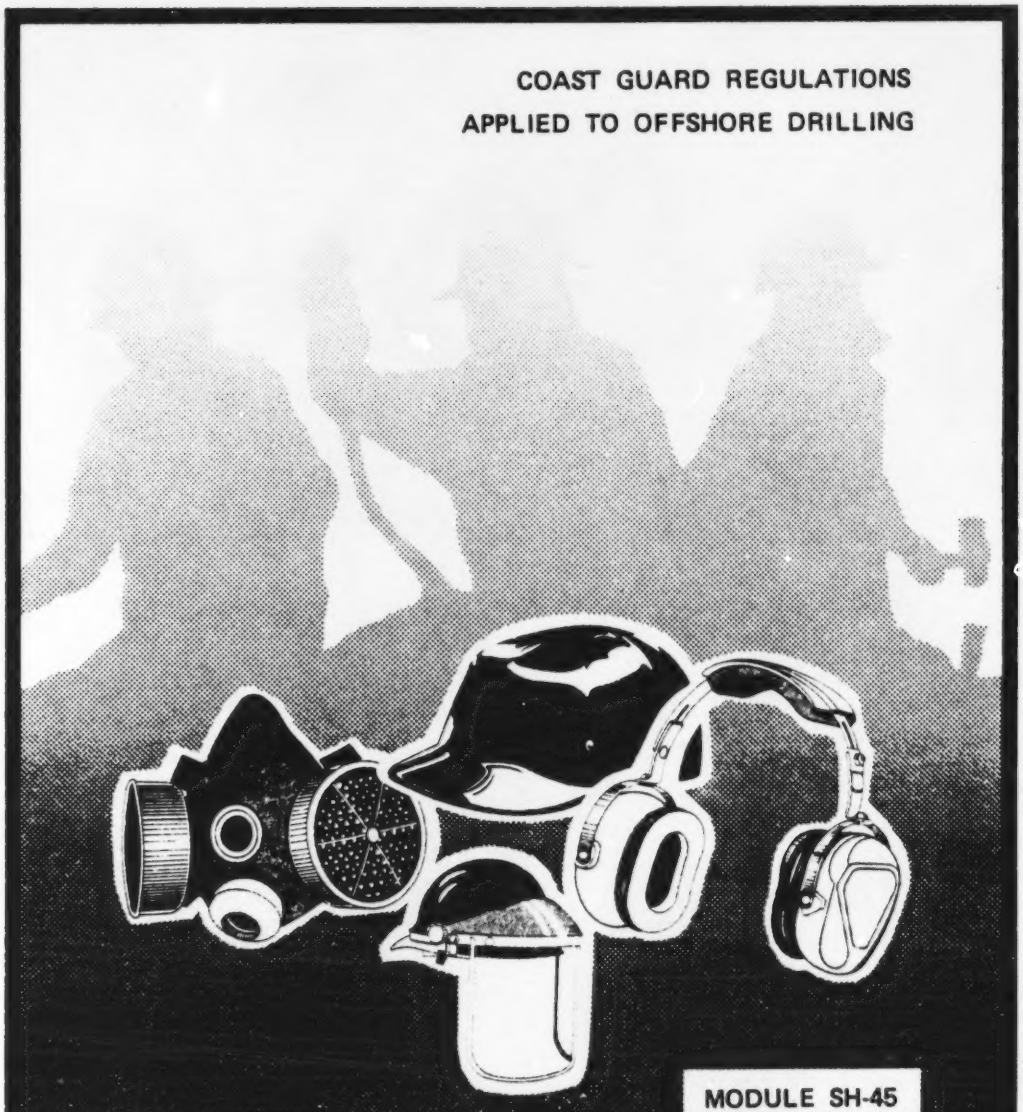
SAFETY AND HEALTH

COAST GUARD REGULATIONS APPLIED TO OFFSHORE DRILLING



MODULE SH-45

ED 3/502

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INTRODUCTION

Oil and gas are two products that have become essential to everyday life – for operating cars or trucks, for heating homes and schools, for generating electric power used in home lighting and factory production. Without oil and gas, Americans would be living like the pioneers who settled and developed this nation. Before oil and gas can be used, they must be obtained through drilling on land or over water. The equipment used to drill for oil and gas is basically the same for each. The workers who drill on land live at home or in a motel while those who drill over water live on an offshore drilling unit.

The mobile offshore drilling unit is HOME to those workers who work over water in the Gulf of Mexico, the Atlantic and Pacific Oceans, and nearly every body of water where oil and gas are known to be or may be present throughout the world. This home must be a safe place to live, for although drilling for oil and gas is a hazardous occupation in itself, the people living on any mobile offshore drilling unit should be afforded a safe environment.

At the present time offshore drilling is being conducted from fixed platforms, foreign flag mobile offshore drilling units, and U.S. Flag mobile offshore drilling units. All drilling units are regulated by the U.S. Geological Survey and the U.S. Coast Guard, when operating on the outer continental shelf.

Fixed platforms and foreign flag mobile offshore drilling units are regulated by the Coast Guard under Title 33 Code of Federal Regulations Subchapter "N," Artificial Islands and Fixed Structures on the Outer Continental Shelf. All offshore drilling units and fixed platforms are regulated by the USCG. under Title 30 Code of Federal Regulations, Part 250, Outer Continental Shelf Orders Governing Oil and Gas Lease Operations.

The materials presented in this module does not imply United States Coast Guard policy or the policy of the cognizant Officer in Charge, Marine Inspection.

This module presents requirements that apply to the design, construction, equipment, inspection, and operation of U.S. Flag Mobile Offshore Drilling Units operating on the United States Outer Continental Shelf as defined in Public Law 95-372, "Outer Continental Shelf Lands Act Amendments of 1978."

OBJECTIVES

Upon completion of this module, the student should be able to:

1. List the types and design of safety equipment used on mobile offshore drilling units. (Page 3)
2. Describe eight safety rules specifically written for mobile offshore drilling units. (Page 6)
3. Characterize the ventilation requirements for mobile offshore drilling units. (Page 8)
4. Discuss the requirements of living quarters, sanitation facilities, hospital facilities, and insect protection for personnel living on mobile offshore drilling units. (Page 9)
5. State two types of rails and describe their requirements when found on mobile offshore drilling units. (Page 12)
6. Briefly describe the requirements for helicopter facilities on mobile offshore drilling units. (Page 13)
7. Specify the fire safety requirements used on mobile offshore drilling units. (Page 16)
8. Describe the emergency procedures and equipment used on mobile offshore drilling units and include unique features of each. (Page 21)
9. List twelve pieces of safety equipment found on mobile offshore drilling units. (Page 25)
10. Discuss the need for and frequency of safety trailing classes and inspections on mobile offshore drilling units. (Page 28)

SUBJECT MATTER

OBJECTIVE 1: List the types and describe the design of safety equipment used on mobile offshore drilling units.

Since January 3, 1979, all mobile offshore drilling units that were to be built to fly the U.S. flag have been requlated by the U.S. Coast Guard to ensure that the unit is safe for the people who will be working and living on board. Each mobile offshore drilling unit (MODU) is inspected by a qualified marine inspector during construction and at least once each year after the drilling unit receives an initial Certificate of Inspection.

The safety equipment required on a MODU is the same for the different types of drilling units. These different types of MODUs are the drillship (Figure 1), the submersible, the semi-submersible (Figure 2), and self-elevating or "jack-up" (Figure 3). These drilling units can be self-propelled, able to move from one location to another; or nonself-propelled, in which case towing assistance is required to move the unit.

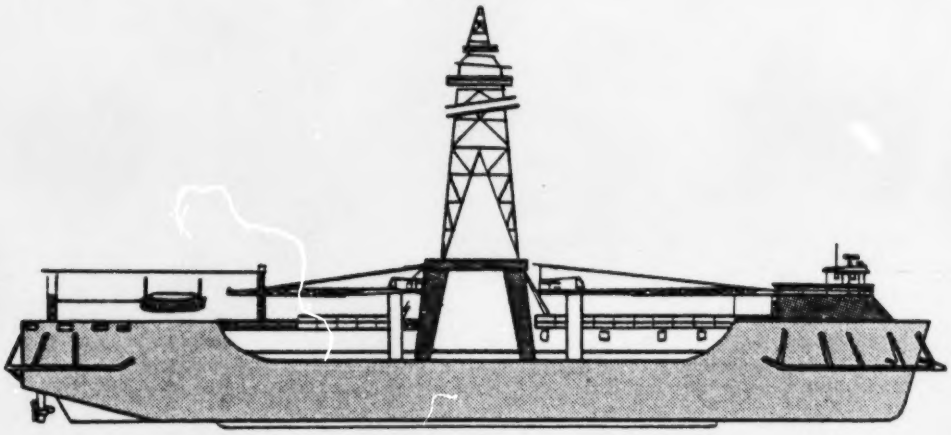

Figure 1. Drillship, self-propelled.

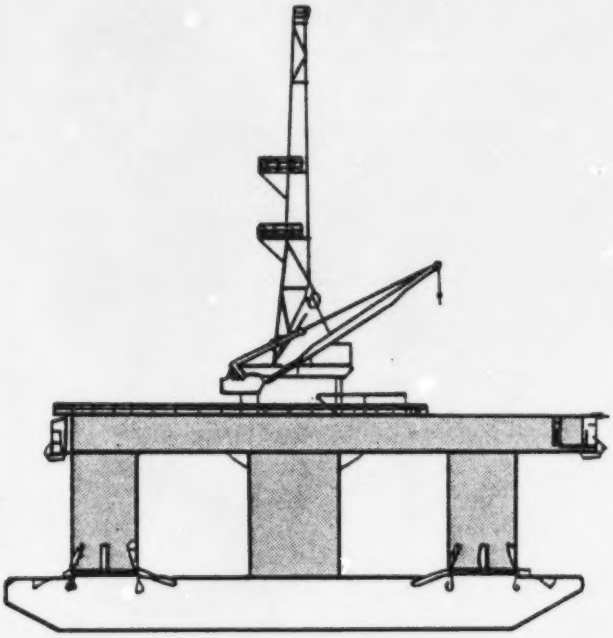

Figure 2. Submersible/semi-submersible (can be self-propelled or nonself-propelled).

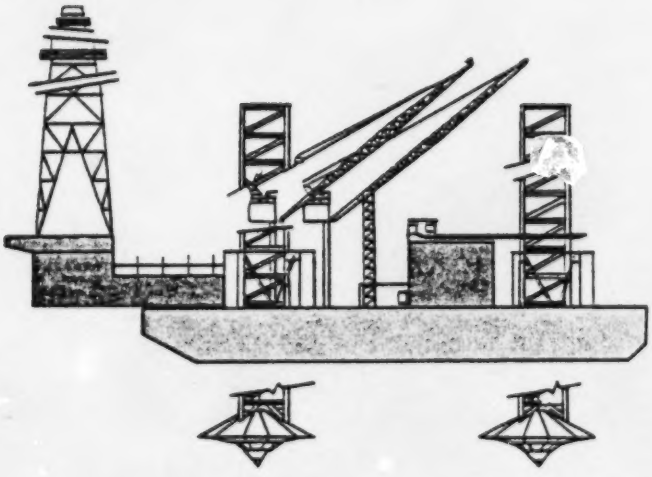

Figure 3. Self-elevating or "jack-up," nonself-propelled.

The safety equipment required by the Coast Guard to be on a MODU is contained in Title 46 Code of Federal Regulations 107 through 109 (46 CFR 107 through 109), Mobile Offshore Drilling Units.

All safety equipment used on the MODU must be Coast Guard approved or acceptable by the Coast Guard. If the equipment is Coast Guard approved, the approval number is permanently attached.

This approval number is obtained by meeting the specifications for each item of equipment as outlined in 46 CFR Subchapter "Q," Specifications. The types of safety equipment required to be on each MODU are generally as follows:

- Lifesaving equipment includes (1) survival capsules, (2) lifeboats, (3) liferafts (Figure 4), (4) life preservers, (5) ring life buoys, (6) line throwing gun, and (7) distress signals.

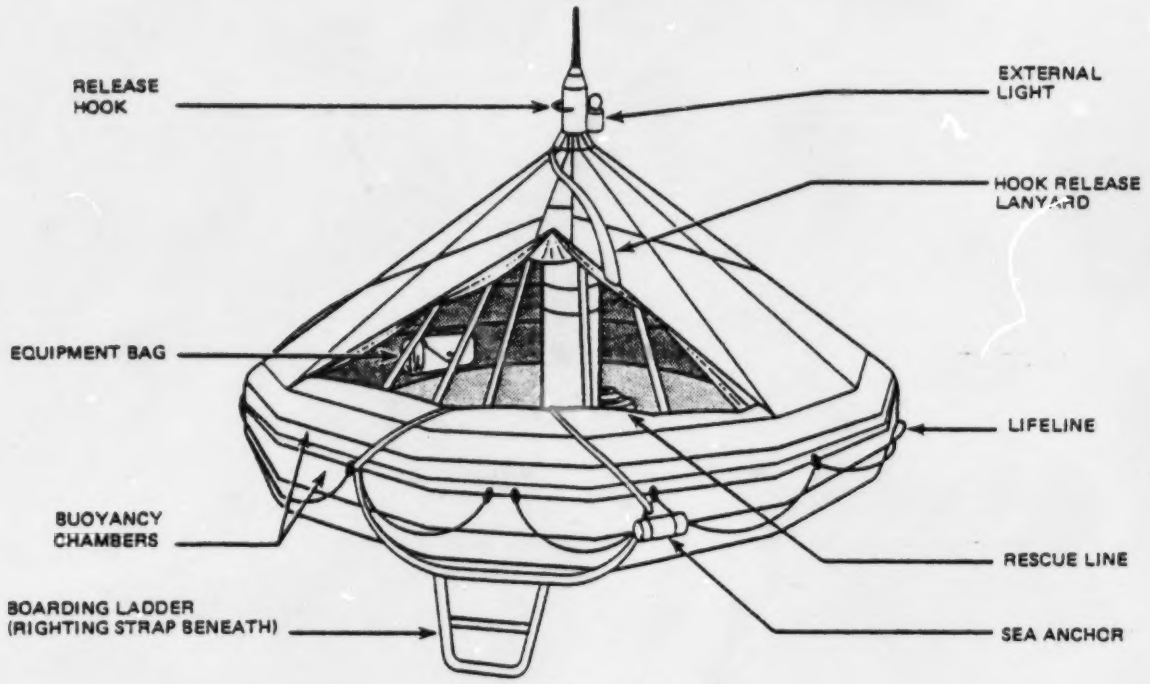

Figure 4. Liferaft.

- Fire fighting equipment includes (1) the fire main system and fire hydrant stations, (2) hand portable fire extinguishers, (3) fireman's outfits, and (4) fire axes.

All of the safety equipment on the MODU must be designed to be used by any person who works on the unit with a minimum amount of instruction in the proper use of each item of safety equipment.

Lifesaving equipment that is required to have operating instructions with pictures to show how to properly use the devices are the survival capsules, lifeboats, and liferafts.

If any item of safety equipment is in a condition that would prevent the immediate use of that item, the Coast Guard inspector will require the item to be removed from the MODU or destroyed. The removed or destroyed item of safety equipment must be immediately replaced with properly operating equipment of the same kind.

It is the Coast Guard inspector's duty, also, to ensure the MODU is a safe working and living place.

ACTIVITY 1:*

1. Name two general types of safety equipment found on all mobile offshore drilling units.
   a. _____
   b. _____
2. Name the part of Title 46 Code of Federal Regulations that all safety equipment must meet in order to receive a Coast Guard approval number.

   _____

OBJECTIVE 2: Describe eight safety rules specifically written for mobile offshore drilling units.

There are eight safety rules written for all MODU's. These rules are part of a life safety system for the drilling unit's personnel in case of a fire or other accident that would require the workers to escape their work area on a moment's notice.

Two means of escape must be located in each of the following areas:

- Each living area with a deck area of 300 square feet (27 square meters).
- Each interior working area that is manned at all times or used as a work area on a regular basis.
- On a weather deck where people work on a regular basis.

The location of the required two means of escape must be through exits that would not allow both exits to be blocked by a fire or other accident.

No door to the means of escape may be designed or built to be locked unless one of two requirements are met. The door must be a crash door, or the door must have a locking device that can easily be forced, with permanent and easily seen instructions for forcing it placed on both sides of the door.

Each stairway and each outside inclined ladder used as a means of escape must be at least 28 inches (70 centimeters) wide and sloped at not more than

*Answers to Activities begin on Page 30)

a 50 degree angle of climb to the horizon. If the installation of a stairway or inclined ladder of 28 inches wide is not practical, special consideration may be given.

Each vertical ladder used as a means of escape must be installed as follows:

- Must have rungs at least 16 inches (41 centimeters) in length.
- The rungs shall not be more than 12 inches (30 centimeters) apart and shall be spaced evenly.
- At least 7 inches (18 centimeters) of clear space with no permanent objects are permitted in back of the ladder. If there is an unavoidable obstruction installed in back of the ladder, then the ladder rung will have at least 4 1/2 inches (11.5 centimeters) of clear space above the rung.
- If the ladder is more than 20 feet (6 meters) high it must be enclosed in a cage or ladder safety device meeting ANSI Standard 14.3 (1974).
- Most important is that no vertical ladder that is unmovable may be made of wood.

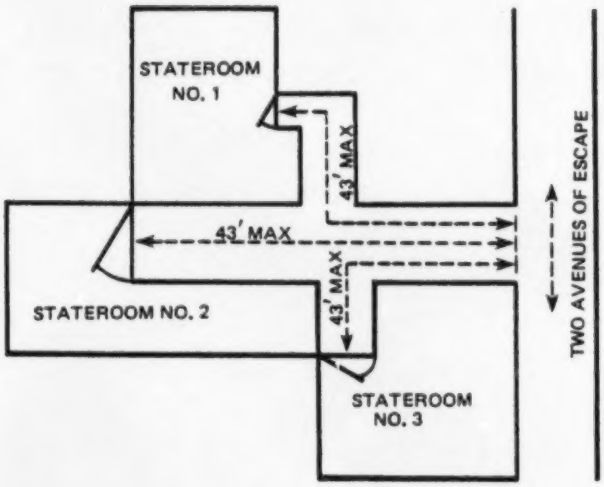

Figure 5. Dead end corridors leading to staterooms.

No dead end corridor (Figure 5) or hallway may be more than 43 feet (13 meters) long.

Direct access to lifeboats, survival capsules, and liferafts boarding areas shall be free from obstructions.

Each unit must have at least one permanent inclined ladder between each weather deck.

ACTIVITY 2:

Fill in the blanks.

1. There must be _____ means of escape from each interior working area that is used on a regular basis.
2. Each inclined ladder is at least _____ inches wide and not more than _____ degrees of climb unless special approval is granted.
3. No dead end hallway may be more than _____ feet long.

OBJECTIVE 3: Characterize the ventilation requirements for mobile offshore drilling units.

Each enclosed space on a MODU must be vented or ventilated to provide fresh clean air to each space. Ventilation systems must include a way to close the system in case of bad weather, fire, or other special circumstances. Each intake in the ventilation system must be located as far away as is practicable from any source of noxious fumes.

A classified location is one in which flammable hydrocarbon gas or vapors resulting from the drilling operations may be present in quantities sufficient to produce an explosive or ignitable mixture.

These requirements apply to enclosed classified locations:

- The air intake must be outside of a classified location.
- An adjacent non-classified location must have a higher air pressure so that any ignitable or flammable gases will not enter the non-classified space.
- Each MODU must have alarms at a continuously manned station that signal when gas is present or the ventilation system is not working in the classified location.
- Each ventilation system for an enclosed classified location must change the air in the location at least once every five minutes.

Special requirements for the cooling (ventilation) of brush-type electric motors in classified locations are contained in NFPA 496-1974, "Standards for Purged and Pressurized Enclosures for Electric Equipment in Hazardous Locations."

ACTIVITY 3:

1. Name two general requirements for a vent or ventilation system found on a MODU.
   a. _____
   b. _____
2. Where will the requirements for brush-type electric motors in classified locations be found?

   _____

OBJECTIVE 4: Discuss the requirements of the living quarters, sanitation facilities, hospital facilities, and insect protection for personnel living on mobile offshore drilling units.

On any mobile offshore drilling unit that has been constructed since January 3, 1979, the Coast Guard has placed certain restrictions on the living spaces. These restrictions specify that there is to be no direct access to any chainlocker, storage space, or machinery space unless there is a solid, close-fitted door or hatch between the space and the living space. Additional restrictions do not allow any manhole cover, tank vent, or sounding tube for a fuel or oil tank to open into any living space. However, the manhole cover and sounding tube may open into a corridor. The tank vents for fuel or oil tanks must always be located outside of the living spaces, with no exception.

When the living spaces are built, the worker's comfort and safety are primary considerations. The personnel on the MODU usually spend 14 days on the unit, then 14 days at home with their families and friends. While on the

unit, these workers are divided into two tours (pronounced "towers") or shifts and work for 12 hours each day.

Each tour is assigned to be berthed in sleeping spaces that are located together so that the minimum amount of disturbance is created by the other working personnel. After 12 hours of work, these off-tour personnel are tired and need a good restful sleep so that they will be alert for their next tour.

The sleeping spaces may not have more than four persons per room. Each room must be large enough to contain a bed and locker for each person in the room. Each sleeping space must be at least 120 square feet (10.4 square meters). The ceiling height of each room must be at least 6 feet 3 inches (191 centimeters) above the floor. In certain cases, a six-person room is allowed, but only for persons who do not usually work on the MODU.

In each sleeping space, each person must have a private berth (bed) and no one else may sleep in that berth. Usually, each sleeping space will have berths that are one over the other to form "bunk beds" but these must not be more than two berths high. These berths are usually made of steel to prevent corrosion and vermin infestation; berths may not be made of wood. Each berth must have a berth light. This allows each person to have a light that will not disturb other persons in the same sleeping space. A locker must be provided for each occupant in the space; clothes and other personal effects can be placed in the locker, thereby keeping the sleeping space floor open.

On each MODU, sanitary and personal hygiene facilities are provided for the workers. There must be at least one toilet, one shower, and one washbasin for every eight persons who occupy a sleeping space. These facilities must be convenient to the sleeping spaces. Each shower and washbasin must have hot and cold running water. Toilet and shower facilities must be separated. Toilets that are next to one another must be separated by a partition that is open at the top and bottom to allow for cleaning and ventilation. It is important that each wash space and toilet space be constructed and arranged to allow the spaces to be kept clean and sanitary. The plumbing and faucets must be kept in good working condition.

People get hungry after working; eating facilities, called messrooms, are present on each MODU. Two requirements are written for messrooms: first, each messroom that is not next to the galley (kitchen) must have a steamtable to keep the food hot. Second, the messroom must be large enough to seat the

number of persons expected to eat at one time. For example, if there are 40 people on the rig and only 15 people will eat at one time then the messroom must be able to seat 15 people.

All of the living spaces must be protected against the admission of insects. To accomplish this requirement, screens are provided when natural ventilation is used. On today's modern MODUs, air conditioning is installed in the living quarters and the need for insect screens is not as great as it once was.

Since drilling is a hazardous occupation, first aid facilities are provided on every MODU. Each unit must have a hospital space or treatment room. This space must be equipped as a first aid facility and may be used only in cases of sickness or injury. The entrance to the first aid facility must be wide enough and arranged so that a person on a stretcher can be easily admitted.

When the accommodation spaces (sleeping, mess, recreational or first aid) are built, certain requirements must be followed. One requirement is that accommodations spaces must be odorproof if they are located next to or immediately above a stowage or machinery space, paint locker, drying room, washroom, toilet space, or any other source of odor. A second requirement is that any accommodation space that is next to or just above a source of noise or heat must be protected from the noise or heat. A third requirement is that any deck or wall must have a covering that prevents the formation of moisture. The fourth requirement is that each accommodation space must be painted or paneled in a light color. The fifth requirement is that any accommodation in which water may collect must have a deck drain in the lowest part of the space.

ACTIVITY 4:

Fill in the blanks.

1. For people living on a MODU, there may not be more than _____ persons per sleeping space.
2. On each MODU, there must be at least one toilet, one shower, and one washbasin for every _____ persons.
3. Each MODU must have a _____ _____ or _____ _____ in case a worker is injured or sick.

OBJECTIVE 5: State two types of rails and describe their requirements when found on mobile offshore drilling units.

To help prevent personnel on a mobile offshore drilling unit from falling overbaord or from one deck to another, bulwarks or guardrails (Figure 6) must be installed. These rails or bulwarks must be at least one meter (39.37 inches) above the deck. If the guardrails or bulwarks would interfere with normal operation of the MODU, a lesser height may be approved.

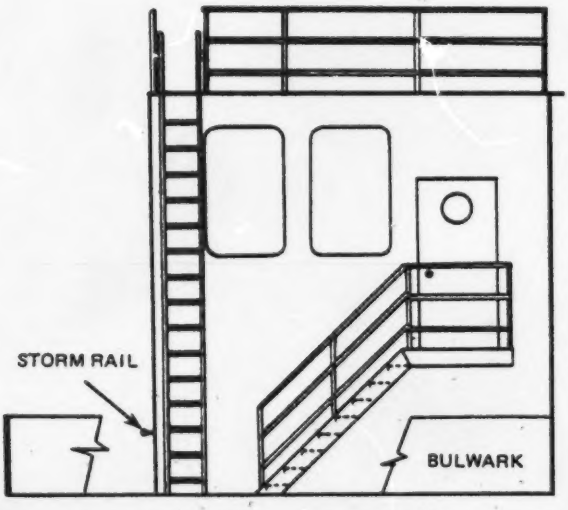

Figure 6. Guardrails and bulwark.

To help prevent personnel from falling from an open deck, guardrails are installed along the outer edge of all decks. These rails must contain at least three courses that are not more than 38 centimeters (15 inches) apart with the lowest course not more than 23 centimeters (9 inches) above the deck.

When the drilling unit is floating in the water, the sea conditions can be very rough, and the personnel can be thrown off balance by the wave action against the unit. To help prevent this from occurring, storm rails (Figure 7) are in the following locations:

- On each side of a passageway more than six feet (1.83 meters) wide.
- On one side of a passageway that is less than six feet (1.83 meters) wide.
- On each side of the deckhouse that is normally accessible.

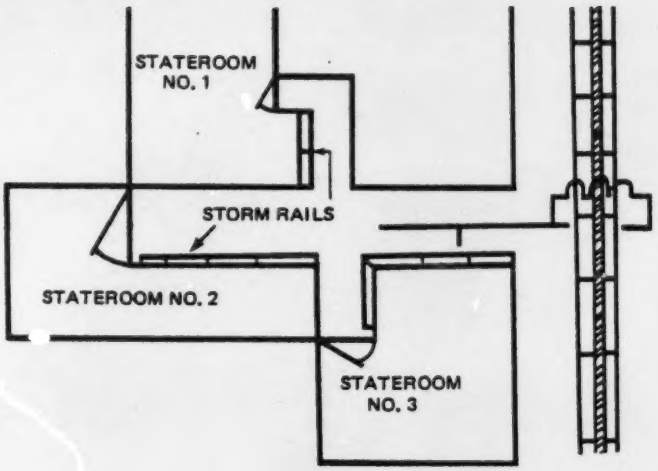

Figure 7. Storm rails.

To prevent MODU personnel from getting their hands, arms, feet or body injured, guards must be installed on or over any piece of moving machinery. This machinery includes belts, gears, sprockets, and flywheels, all of which may be hazardous if not guarded.

ACTIVITY 5:

Name two types of rails that must be installed on a MODU.

1. _____
2. _____

OBJECTIVE 6: Briefly describe the requirements for helicopter facilities on mobile offshore drilling units.

On most of the mobile offshore drilling units, helicopter facilities are built onto the unit during construction. The facilities are used by the unit personnel during crew change, in case of emergency evacuation, and to carry out the business of drilling for gas and oil.

The helicopter deck (see Figure 8) must be built to safely hold the largest helicopter intended to be used on the MODU. The size of the helicopter

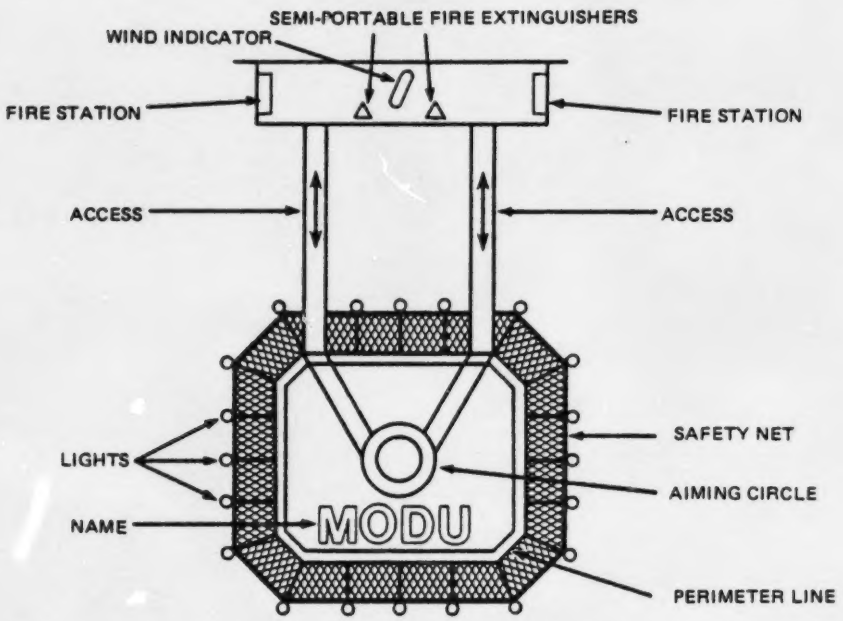

Figure 8. Helicopter facility.

deck must be at least the diameter of the main rotor blade in order to accommodate safe landing and take-off of the helicopter.

The helicopter deck must be located where the helicopter pilot will have a clear approach and departure path in all weather conditions in which the helicopter is allowed to operate.

The landing area of the helicopter must have the following:

- A non-skid surface to help prevent the helicopter from sliding on a wet or icy landing deck.
- Drains which prevent liquid, such as water or fuel, from collecting and being spread to other parts of the MODU.
- Recessed tie-down points to secure a helicopter in case of high winds or overnight storing.
- The landing area must be free of projections to allow a flat landing surface.
- The helicopter deck lights may be allowed to be above the outer edge of the helicopter deck provided the lights do not interfere with landings and take-offs.

Surrounding each helicopter deck is a safety net that helps prevent a person or object from falling off the heliport. This safety net must be at least 1.5 meters (4 feet 11 inches) wide. The outer edge of the safety net

must not extend more than 15 centimeters (6 inches) above the surface of the helicopter deck.

Each helicopter facility must have a main and an emergency access/egress (entry/exit) route which should be as far apart as practicable. The two routes allow for quick evacuation of the helicopter deck in case of an accident or fire on a helicopter that has landed in an emergency.

If the helicopter is going to be fueled on the MODU, certain additional requirements must be followed. The fuel tanks must be installed as far as practicable from the landing area and sources of vapor ignition. If the fuel tanks are built as part of the unit, these tanks must meet the requirements of 46 CFR (Code of Federal Regulations) Subpart 58.50, Independent Tanks. If the helicopter fuel is brought out from a shore base, these tanks, called marine portable tanks, must be built to and meet the requirements of 46 CFR Part 64, Marine Portable Tanks.

In order to "fill-up" the helicopter safely with fuel on the helicopter deck, the proper fuel transfer equipment is necessary. This equipment includes a nozzle which must be held open while fueling, commonly called a "deadman" nozzle. The fuel hose itself must have a storage reel and the fuel hose must also be equipped with a static grounding device which prevents static electricity build-up and discharge during the fueling operation.

If an electric fuel pump is used to transfer the helicopter fuel, the pump must have a light to indicate if the fuel pump is "on." Emergency shut-off switches for the fuel pump are required to be installed at each access route to the helicopter deck.

To prevent helicopter fuel from spilling into the water or spreading on the deck from the hose reel or fuel pump, a means to contain the spilt fuel is necessary.

To assist the pilot during landing, each helicopter deck has certain visual aids. A wind directions indicator, or wind sock, must be installed in an unobstructed area where the pilot can easily see the indicator as the helicopter approaches. At night, the helicopter deck has perimeter lights to show the outline of the helicopter deck. These lights are placed blue and yellow in an alternating order. The lights cannot be more than ten feet (3 meters) apart.

To make easier the identification from the air of the MODU and helicopter deck, the helicopter deck has marked a perimeter line at least 16 inches (40 centimeters) wide, the name of the unit, and an aiming circle. These markings must be in a contrasting color to the surface of the helicopter deck.

ACTIVITY 6:

Name the four requirements for each landing area of a helicopter deck.

1. _____
2. _____
3. _____
4. _____

OBJECTIVE 7: Specify the fire safety requirements used on mobile offshore drilling units.

On all mobile offshore drilling units, different means to control and extinguish fires are installed during construction. The different means include the fire main system, fixed carbon dioxide (CO_2) systems, fixed HALON systems, hand portable and semi-portable fire extinguishers.

The fire main system includes the fire pumps, fire hydrants, hoses, nozzles, and low velocity spray applicators.

On each MODU there must be at least two fire pumps driven from a separate power supply and in separate spaces, in case of a fire which could make one of the fire pumps inoperative. The fire pumps are used to supply water to the different fire hydrants throughout the unit at a continuous pressure of at least 50 pounds per square inch at the highest and farthest fire hoses from the fire pumps.

In order to apply the water from the fire pumps on a fire, the fire hydrants and associated equipment are used. Each MODU must have enough fire hydrants so that each space on the unit can be sprayed with water from at least two different fire hoses spraying water. Each fire hydrant must have

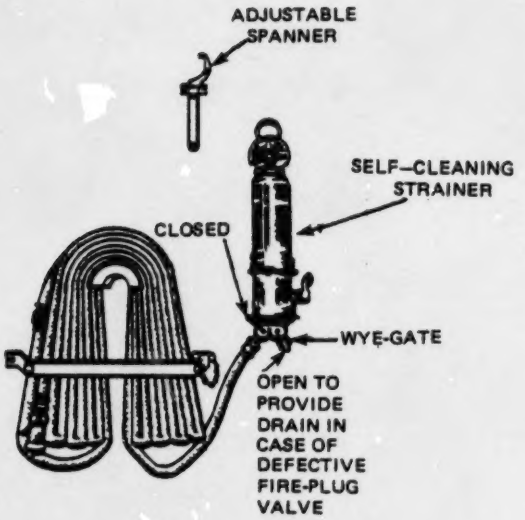

Figure 9. Fire hydrant station.

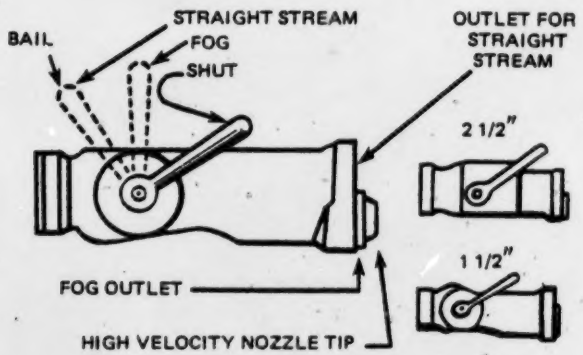

Figure 10. Combination fire hose nozzle.

at least one spanner wrench and one fire hose rack or reel for each fire hose (see Figure 9).

Each fire hose must have a combination straight stream and water spray fire hose nozzle (see Figure 10) that is approved under 46 CFR 162.027. Each fire hydrant serving machinery spaces that have oil fired boilers, internal combustion engines, or an oil fuel unit, and each fire hydrant for the helicopter deck must have a low velocity spray applicator that is approved under 46 CFR 162.027 (see Figure 11).

In addition to the fire main system certain spaces are required to have a fixed carbon dioxide (CO_2) or HALON fire extinguishing system (see Figure 12). These spaces are as follows:

- Each paint locker.
- Each enclosed space that has internal combustion or gas turbine main propulsion machinery.
- Each enclosed space that contains internal combustion machinery that is at least rated to 1000 B.H.P. (brake horsepower).
- Each enclosed space that contains a fuel oil transfer pump, purifier, or fuel oil valve manifold for the main propulsion machinery or internal combustion machinery rated to 1000 B.H.P.

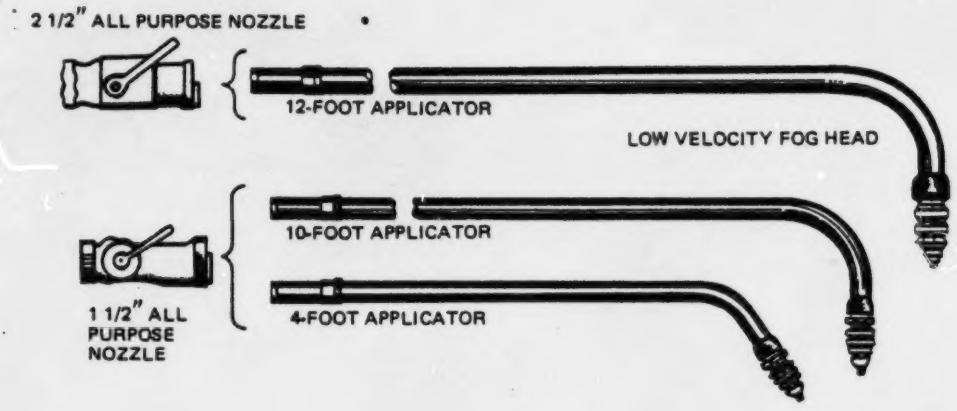

Figure 11. Low velocity spray applicators.

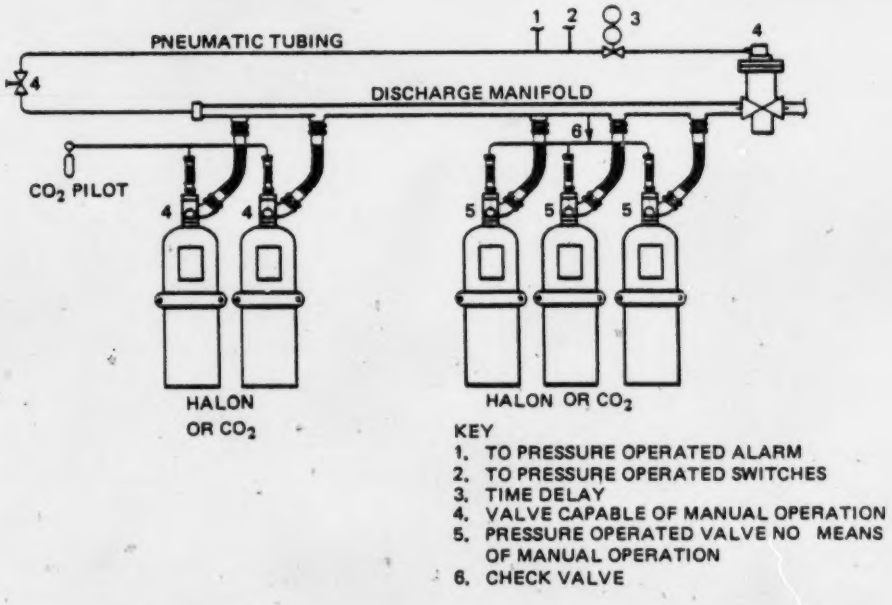

Figure 12. Fixed CO_2 or HALON system.

- Each enclosed ventilation system for electric motors or generators used for the bilge pumps, fire pumps or propulsion spaces.
- Each fixed CO_2 and HALON system must be approved by the Merchant Marine Technical office of the Coast Guard before the system is installed on the MODU.

Throughout the MODU, hand portable and semi-portable fire extinguishers are located to be used as a first defense in case of a fire. Each fire extinguisher must be Coast Guard approved under 46 CFR 162.028, Fire Extinguishers, Portable, Marine Type, and 46 CFR 162.039, Fire Extinguishers, Semi-portable, Marine Type. Table 1 is a guide for the location of fire extinguishers throughout a MODU. Each Officer in Charge, Marine Inspection may require more fire extinguishers if they are considered necessary for the fire protection unit.

Fire protection for helicopter facilities is provided for all mobile offshore drilling units with a helicopter deck. At least two fire hydrants connected to the unit's fire main system must be located at each helicopter deck access. If the helicopter deck is used for a fueling operation then a protein foam or aqueous film forming foam system must be installed at two accesses to the helicopter deck. The foam system must have enough foaming agent to continuously discharge for five minutes at the maximum discharge rate of the system. The fueling storage area and fuel transfer equipment for the helicopter deck must also be protected in case of a fire. This protection can be a protein foam or aqueous film forming foam system capable of five minutes of discharge, or 50 pounds of dry chemical agent for each 300 square feet.

TABLE 1. HAND PORTABLE FIRE EXTINGUISHERS AND SEMI-PORTABLE FIRE-EXTINGUISHING SYSTEMS.

SPACE	CLASSIFICATION	QUANTITY AND LOCATION
SAFETY AREAS		
Wheelhouse and control room	C-I	2 in vicinity of exit
Stairway and elevator enclosure		None required
Corridors	A-II	1 in each corridor not more than 150 ft (45 m) apart (May be located in stairways)
Lifeboat embarkation and lowering stations		None required
Radio rooms	C-I	2 in vicinity of exit
ACCOMMODATIONS		
Staterooms, toilet spaces, public spaces, offices, lockers, small storerooms, and pantries, open decks and similar spaces		None required
SERVICE SPACES		
Galleys	B-II or C-II	1 for each 2500 ft² (232 m²) or fraction thereof suitable for hazards involved
Paint and lamp rooms	B-II	1 outside each room in vicinity of exit
Storerooms	A-II	1 for each 2500 ft² (232 m²) or fraction thereof located in vicinity of exits, either inside or outside the spaces
Workshop and similar spaces	C-II	1 outside each space in vicinity of an exit
MACHINERY SPACES		
Oil-fired boilers: Spaces containing	B-II	2 required in each space
Oil-fired boilers, either main or auxiliary, or their fuel oil units	B-V	1 required in each space
Internal combustion or gas turbine propelling machinery spaces	B-II	1 for each 1000 brake horsepower but not less than 2 nor more than 6 in each space
	B-III	2 required in each space (See Note 1)
Motors or generators of electric propelling machinery that do not have an enclosed ventilating system		1 for each motor or generator
Motors and generators of electric propelling machinery that have enclosed ventilating systems		None required
AUXILIARY SPACES		
Internal combustion engines or gas turbines	B-II	Outside the space containing engines or turbines in vicinity of exit
Electric emergency motors or generators	C-II	1 outside the space containing motors or generators in vicinity of exit
Steam driven auxiliary machinery		None required
Trunks to machinery spaces		Do
Fuel tanks		Do
MISCELLANEOUS AREAS		
Helicopter landing	B-V	1 at each access route
Helicopter fueling facilities	B-IV	1 at each fuel transfer facility (see Note 2)
Drill floor	C-II	2 required
Cranes with internal combustion engines	B-II	1 required

Note 1 - Not required where a fixed gas extinguishing system is installed.
Note 2 - Not required where a fixed foam system is installed in accordance with Sec. 108-489 of this subpart

ACTIVITY 7:

Using Table 1 as a guide, how many and what classification fire extinguishers are required for the following spaces.

Space	Quantity	Classification
Control Room	_____	_____
Paint Room	_____	_____
Drill Floor	_____	_____
Helicopter Landing Deck with Two Access	_____	_____

OBJECTIVE 8: Describe the emergency procedures and equipment used on mobile offshore drilling units and include unique features of each.

On each mobile offshore drilling unit, different tests, drills, and inspections are required to be conducted.

On a self-propelled MODU, the master or person in charge will ensure that the steering gear, whistles, general alarm and communication system are inspected and tested 12 hours before getting underway or at least once each week if underway or on a drilling location. The nonself-propelled units are required to test the whistles and general alarm system only since there is no steering gear.

The cleanliness and sanitary condition of all the living spaces is the responsibility of the master or person in charge. In the machinery spaces, the chief engineer or engineer in charge has the duty to ensure the machinery spaces are clean and sanitary.

Before changing shift, the chief engineer or engineer in charge must inspect the boilers and machinery on the unit and report to the master or person in charge and the local Coast Guard Officer in Charge, Marine Inspection, any equipment not in operating condition. This inspection does not include any of the drilling machinery.

At least once every four months, the line-throwing gun must be test fired by the master or person in charge. Personnel on the unit are instructed in

the proper use of the line-throwing gun by the master or person in charge. The line-throwing gun is used during an emergency to pass an emergency tow line when being moved from one drilling location to the next in case of losing the main propulsion machinery or if the tow line breaks.

Each self-propelled MODU must have a Class A emergency position indicating radio beam (EPIRB) that is approved under 46 CFR 161.011. Figure 13 shows an EPIRB in stowed position. The EPIRB is mounted to allow it to float free and automatically activate if the MODU sinks (see Figure 14). The EPIRB must be tested monthly by the master or person in charge to ensure that it is operating properly.

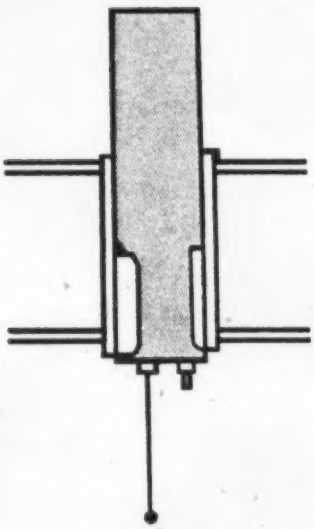

Figure 13. EPIRB in stowed position.

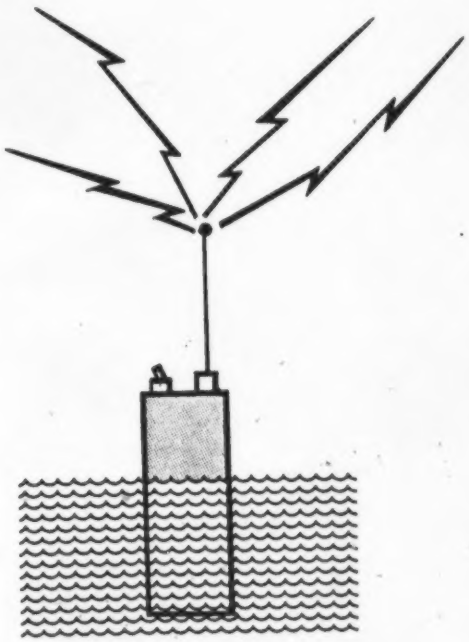

Figure 14. EPIRB automatically activated in water.

Before a MODU can move from one drilling location to another, the master or person in charge must ensure that all the watertight doors, watertight hatches, and watertight scuttles are closed and watertight. These design features for watertight integrity are necessary to prevent flooding of spaces from one to the next in case one of the compartments floods while underway.

The master or person in charge must ensure that the emergency lighting and power systems are tested. Each emergency lighting and power system must be tested at least once each week. Each emergency generator is tested at least once a month by operating the generator under its load for at least two hours. Each storage battery for the emergency lighting and power system must be tested every six months under load for at least two hours. These emergency systems are used in case of a failure of the main lighting and power system.

Each week, the master or person in charge must conduct a fire drill to ensure that all personnel on the MODU report to the proper station assigned on the unit's station bill. The personnel must demonstrate the duties assigned to them on the station bill at this time. Each fire pump is started, and the rescue and safety equipment is brought from the emergency lockers.

Along with the fire drill, a boat drill must be conducted at least once a week by the master or person in charge. During the boat drill, all personnel must report to the station assigned in the unit's station bill and demonstrate their ability to perform the duties assigned. Each lifeboat is prepared for launching and weather permitting, one of the lifeboats is partially lowered and the engine started and operated. Each person not assigned a duty in the station bill is instructed in the proper use of life preservers.

At least once every three months, each lifeboat (Figure 15) must be lowered and water launched as part of the boat drill. Each lifeboat is inspected to ensure that it is properly equipped at this time. Every week each motor-propelled lifeboat is started and checked to ensure that the ahead and astern (reverse) position operate properly. At least once each year, the lifeboats are cleaned and thoroughly inspected. The fuel in each motor-propelled lifeboat must be changed at least once each year. If the lifeboat is equipped with a rechargable battery for the lifeboat radio, the battery must be fully charged at least once each week and the radio transmitter tested. These tests are the responsibility of the master or person in charge.

When the lifeboats are launched, the master or person in charge must ensure that the electric power operated lifeboat winches are in proper working condition. This inspection includes the motor controllers, emergency switches, master switches and limit switches. The drain plugs must be removed from the electrical enclosures to ensure no water has collected in the electrical enclosures. This inspection must be conducted at least once every three months.

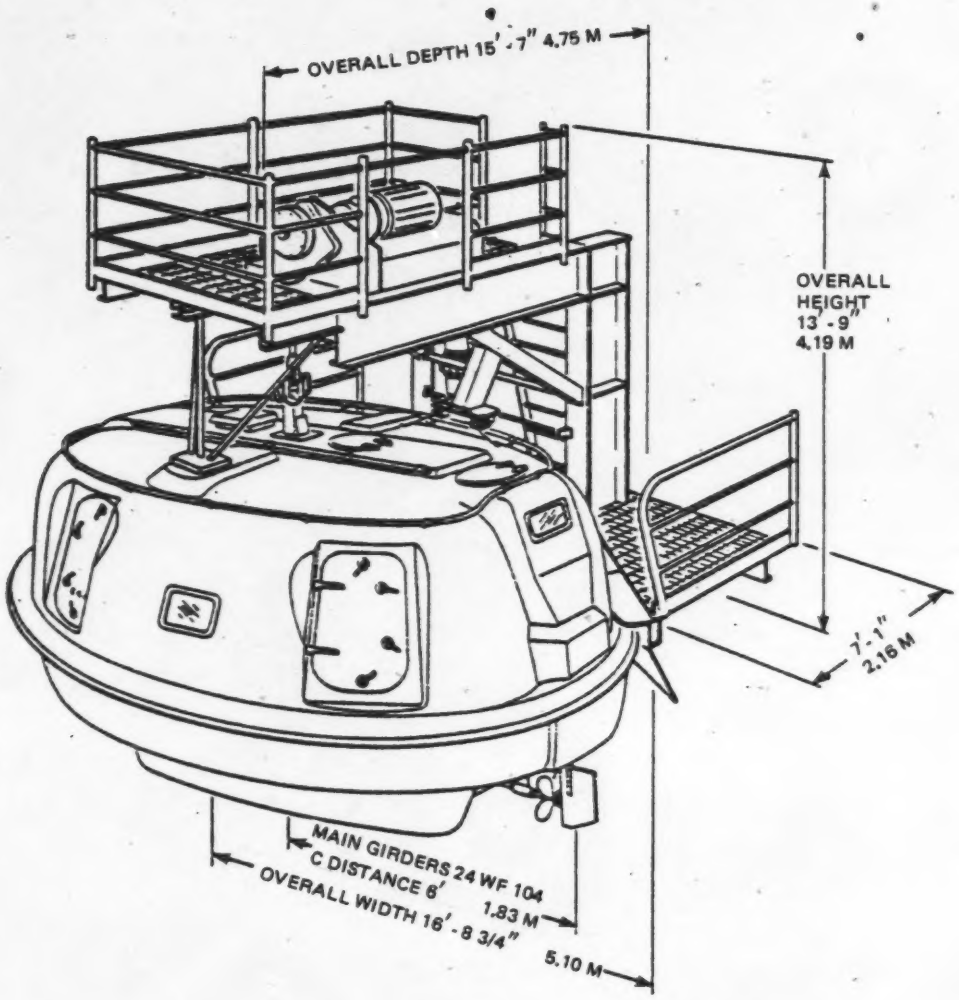

Figure 15. 50-Man launch and recovery system. (U.S.C.G. approved.)

The master or person in charge must ensure that each hand portable and semiportable fire extinguisher and the fixed fire extinguishing systems are tested and inspected at least once every twelve months.

ACTIVITY 8:

Describe four emergency procedures and equipment and include a unique feature of each.

1. _____
_____
2. _____
_____
3. _____
_____
4. _____
_____

OBJECTIVE 9: List 12 pieces of safety equipment found on mobile offshore drilling units.

In addition to the safety equipment already presented in this module, additional safety equipment is also required to be on a MODU. This equipment is necessary for the protection of the personnel on the unit and is designed to save lives or prevent accidents if it is properly used and used only for the purpose intended.

When working over the water, buoyant work vests (Figure 16) are provided. These work vests which must be Coast Guard approved, are made from unicellular plastic foam, Indian orange in color, and designed to turn an unconscious wearer face up in the water.

Life preservers or personal floatation devices are provided for every person on a MODU. Each life preserver must be Coast Guard approved. The life preservers are made from kapok, fibrous glass, or unicellular plastic foam.

Figure 16. Buoyant work vest.

Indian orange in color, and designed to turn an unconscious wearer face up in the water. Each life preserver is equipped with a whistle, personal flotation device light, and retroreflective material. These life preservers are used only during boat drills and when it becomes necessary to abandon the MODU in the case of an emergency.

On each self-propelled unit, a means to measure the depth of water is required. This can be mechanical or electronic sounding devices. The devices are used to help prevent the MODU from grounding when crossing in shallow water.

Every mobile offshore drilling unit must have at least two fireman's outfits. These outfits are used in case of a fire and are designed to protect the firefighter from heat and scalding steam. Each fireman's outfit contains a self-contained breathing apparatus, a three-cell explosion proof flashlight, an oxygen and explosive meter, a lifeline, boots of insulated materials so the firefighter will not be electrocuted, and a helmet.

Every MODU must have on board a first aid kit that is large enough for the number of persons on the unit and is accessible to everyone on board.

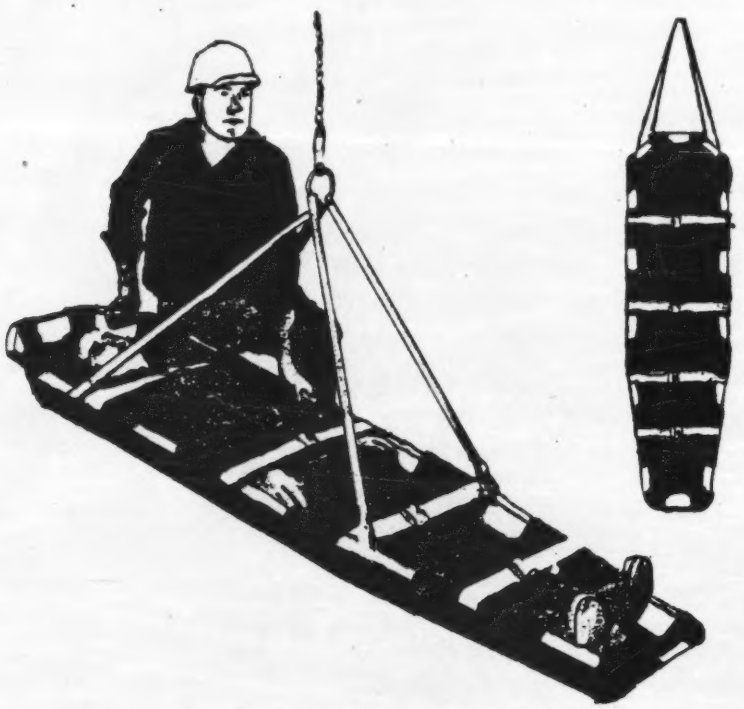

Figure 17. Typical litter.

Each drilling unit must also have a litter (Figure 17) that can be used on the type of helicopter that services the MODU. This litter is used to carry injured personnel and must be accessible to everyone on the unit.

Each unit that would normally use a pilot must have a pilot ladder. (A pilot on a MODU is a person who directs

the unit into or out of a port or through dangerous waters.) This ladder must have spreaders, a man rope, and a safety line. Lighting over the side of the unit must be provided where the pilot boards.

Each self-propelled MODU on an international voyage that is required to have a radiotelegraph or radiotelephone must carry a book titled "The International Code of Signals." This book provides standard signals used by all the different nations of the world in case of emergency and is understood by all the different nations regardless of the native language.

Each self-propelled MODU must have a magnetic compass. If the MODU is over 1600 gross tons, then the unit must also have a gyrocompass that is illuminated. The compass is used for navigation of the MODU while it is underway.

Each unit with 30 persons or less must have on board at least one lifeboat. This lifeboat is also called a survival capsule. On MODUs with more than 30 persons, there must be at least two lifeboats. The total number of lifeboats required on a MODU must be able to hold all of the persons on the MODU. For example, there are 56 persons on a MODU. The MODU must have at least two 28-person lifeboats, Coast Guard approved, motor propelled, with a rigid permanent cover, and international orange in color. The lifeboats or survival capsules are designed to protect personnel from exposure to weather and fire in case the MODU must be abandoned in an emergency.

Each mobile offshore drilling unit must have enough inflatable liferafts on board to hold 100% of the persons allowed on board. These liferafts must be Coast Guard approved. The liferafts are used in case of an emergency when the MODU must be abandoned and the lifeboats are not accessible. Each liferaft must be able to carry at least six persons but not more than 25 persons. If the unit has enough lifeboats to carry 200% of the persons allowed on the unit then the unit does not have to have the liferafts.

Each MODU must carry at least eight ring life buoys. These ring buoys are located at different places on the unit so that each ring life buoy is readily accessible to everyone on board. The ring buoys are thrown to a person in the water in case a person falls overboard while the MODU is on a drilling location or underway. Each ring life buoy must be Coast Guard approved and must be Indian orange in color.

On some of the mobile offshore drilling units, a fire detection and alarm system is installed. This system is not required and may be installed by the owner of the MODU provided the system has been approved by the Commandant of the Coast Guard or the Commandant's designated representative.

ACTIVITY 9:

Name six pieces of safety equipment found on a mobile offshore drilling unit.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

OBJECTIVE 10: Discuss the need for and frequency of safety training classes and inspections on mobile offshore drilling units.

Drilling for oil and gas is a hazardous occupation. Because it is hazardous, the workplace can and MUST be a safe place. The responsibility for safety is not only that of the Coast Guard but must be shared by every individual. Every person offshore must be capable of recognizing an unsafe condition, reporting the condition to the proper person, and correcting the unsafe condition.

Safety training classes are held on each drilling unit. The purpose of these classes is to give instructions on the proper safety procedures to follow using the correct safety equipment or in doing a job in a safe manner. Safety classes are held at least once each week on a drilling unit. If a person is injured doing a job, the person will not be able to perform a job in a safe manner and as a result may endanger other personnel.

As seen in Objective 8, inspections are conducted at least once each week on certain equipment by the master or person in charge. These inspections will show if the equipment is in a proper working condition. If an

item of safety equipment is not in the proper condition for immediate use, then that item must be repaired or serviced and be put back in the proper operation condition. The Coast Guard is required to inspect every U.S. flag MODU at least once each year.

Each and every item of safety equipment has a purpose and must only be used for that purpose. One day that item of safety equipment may save a life.

ACTIVITY 10:

What is the purpose for holding safety training classes on a mobile offshore drilling unit?

_____

_____

_____

REFERENCES

Code for the Construction and Equipment of Mobile Offshore Drilling Units, MODU Code, Inter-Governmental Maritime Consultative Organization, 1980, Resolution A.414(XI).

46 CFR Subchapter "I-A," Mobile Offshore Drilling Units.

46 CFR Subchapter "Q," Specifications.

46 CFR Subpart 58.50, Independent Tanks.

46 CFR Part 64, Marine Portable Tanks.

International Convention for Safety of Life at Sea, 1960 and 1974. (SOLAS 1960 and SOLAS 1974), Inter-Governmental Maritime Consultative Organization.

Navigation and Vessel Inspection Circular No. 6-80. Guide to Structural Fire Protection Aboard Merchant Vessels.

NFPA No. 407-1975, Standard for Aircraft Fuel Servicing.

NFPA No. 496-1974, Standards for Purged and Pressurized Enclosures for Electrical Equipment in Hazardous Locations.

Public Law 95-372, "Outer Continental Shelf Lands Act Amendments of 1978."

ACTIVITY 1

1. a. Lifesaving equipment.
   b. Firefighting equipment.
2. Subchapter "Q," Specifications.

ACTIVITY 2

1. Two.
2. 28 inches ... 50 degrees.
3. 43 feet.

ACTIVITY 3

1. a. Means to close the system.
   b. The intakes must be located as far as practicable away from a source of noxious fumes.
2. NFPA 496-1974, "Standards for Purges and Pressurized Enclosures for Electrical Equipment in Hazardous Locations."

ACTIVITY 4

1. Four.
2. Eight.
3. Hospital space ... treatment room.

ACTIVITY 5

Any two of the following:

1. Guardrails.
2. Bulwarks.
3. Stormrails.
4. Moving machinery guards.

ACTIVITY 6

1. Have a non-skid surface.
2. Have drains.
3. Have recessed tie-down points.
4. Be free from projections.

ACTIVITY 7

Quantity	Classification
2	C-I
1	B-II
2	C-II
2	B-V

ACTIVITY 8

Any four of the following:

1. Fire line throwing gun - used to pass an emergency tow line.
2. Test EPIRB - ensure working and able to float free in case unit sinks.
3. Close watertight appliances - prevent flooding from one compartment to the next.
4. Test emergency lighting and power systems - used if the main source of power is lost.
5. Conduct a fire drill - train personnel in carrying out the assigned task as indicated on the MODU's station bill.
6. Conduct a boat drill - train personnel to report to the assigned station and carry out the duties assigned by the unit's station bill.
7. Launch the lifeboats - ensure the lifeboats are working properly.
8. Check electrical power operated lifeboat winches - ensure all electrical components are in a proper working order.

ACTIVITY 9

Any six of the following:

1. Buoyant work vests.
2. Life preservers or personal flotation devices.
3. Sounding apparatus or means to measure the depth of water.
4. Fireman's outfits.
5. First aid kit.
6. Litter or stretcher.
7. Pilot ladder.
8. International Code of Signals.
9. Compass - magnetic or gyrocompass.
10. Lifeboat or survival capsule

11. Ring life buoys.
12. Fire detection and alarm system.

ACTIVITY 10

To give instructions on the proper safety procedures to follow using the proper safety equipment provided.